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ABSTRACT

The purpose of this study is to show that there is a gradual and measurable development in the drawing of space representation concepts. A further purpose is to show that children's drawings of a village (which represent relations among concepts) may be a better measure of their conceptual maturity than their drawings of a man (which represent a single concept). One hundred and fifty-eight normal children, ranging from age 5 through 13 and attending grades 1 through 7, were asked to make a drawing of a village. Each child was tested individually and was asked, prior to drawing, to define a village. Each was also asked to make a drawing of a man. A scale for scoring the children's drawings was constructed. The original scale comprised 62 items scored present or absent. These items were loosely classified under five categories: differentiation, diversification, complexity, animation, and spatial organization (topological, euclidian, projective). A revised scale of 53 items was used for statistical analyses. Findings indicate no clear-cut sex differences. Reliability between two judges on a sample of 45 drawings was .96. Split-half reliability was .94. The correlation of the total village score with the score on the Draw-A-Man Test (DAMT) was .69. Results show there is a steady development with age and grade in the ability to make a representation of a village. Advantages of the village scale over the DAMT are that it measures a more complex concept, can be used with older subjects more reliably, and that it relies more on integrative and spatial abilities. Twelve children's drawings showing the development of spatial representation are appended. (Author/RH)

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DEVELOPMENT OF THE REPRESENTATION OF SPACE IN NORMAL CHILDREN

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by Dr. M. Miljkovitch

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SUMMARY

The conceptual maturity of the child has been shown to be adequately measured by his/her drawing of a person (Harris, 1963). The purpose of this paper is to show that the drawing of a village does follow the same developmental laws. A scale for scoring children's village drawings was constructed. 149 normal children from a rural community ranging from ages 5 through 13 and attending grades 1 through 7 were individually tested. The results show that there is a steady development with age and grade in the representation of a village. At first, the different elements are juxtaposed on the page; they become more and more organized and integrated into a whole with perspective being more and more used. Correlation between the score on the Harris-Goodenough scale and the score on the Village scale has been found to be .69. The advantages of this scale over the Draw-A-Person test are that it measures a more complex concept and hence can be used with older subjects and be more reliable and that it relies more on integrative and spatial abilities.

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Development of the Representation of Space in Normal Children

The Drawing of a Village

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The purpose of the study is to show that there is a gradual and measurable development in the drawing of space representation concepts. The idea is that drawings involving not only the representation of a concept (such as a man) but also the representation of relationships among concepts (such as in a village) may be better instruments for assessing the conceptual maturity of children than the classic Draw-A-Man test.

One hundred and fifty-eight normal children, ranging from age 5 through 13 and attending grades 1 through 7, have been asked to make the drawing of a village. Each child was tested individually and was asked prior to drawing to define a village. Each was also asked to make the drawing of a man.

Three different sources have served as a background for this research: Werner's theory along with Rorschach's studies of developmental level; an empirical research by Barnhart on "Developmental stages in compositional construction in children's drawings"; and finally Piaget's theory and findings on space representation in children.

According to Werner's theory (1957, p. 126), development "proceeds from a state of relative globality and lack of differentiation to a state of increasing differentiation, articulation and hierarchic inte-

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gration". This view has been proven valid in Rorschach's studies by Hemmendinger (1953) showing that children's percepts on this test are at first vague, syncretic and amorphous becoming more differentiated, better articulated and organized with age. Working with drawings on the following theme: "children playing out-of-doors in the snow in the winter-time in a park", Barnhart, as early as 1942, has shown that "there is a slow change from an aspatial disposition of units to a form of spatial organization marked by linear and aerial perspective, overlapping of forms and diminution of size with distance" (p. 163). However, his data have not been quantified nor replicated. Piaget, in his 1948 book, "The representation of space in children" has studied in detail how the child first acquires notions of topological space (things are close to each other, inside each other, separated from each other...) before acquiring the more sophisticated notions of euclidian geometry (equality, similarity among objects) and of projective geometry (in which things are seen from a particular point of view and only from it.)

These theories and studies have provided us with a framework for selecting specific items for our scale. The original scale comprised 62 items scored 'present' or 'absent'. These items may be loosely classified under 5 categories:

Differentiation: There are 14 items in this subscale. From a syncretic idea of what a village is, evolves a more differentiated concept. Before 5 years of age, a house may represent the whole village. Then several stereotyped buildings seem to be a good enough representation of a village to the child. Later, at around 7 years of age, the buildings begin to assume precise functions: the school

the church, some stores appear. The village does not only include buildings but other elements as well such as roads, cars, trees... Examples of items are; at least three different types of buildings; presence of buildings with a precise function; signs of urban civilization other than buildings, such as cars, poles, and road signs; presence of a road.

Diversification: There are 8 items in this subscale. At first, the function of an element is entirely defining this element so that, for example, all individual houses will be represented alike. Around 7 or 8 years of age, things begin to become individualized: doors and windows are not similar on all buildings; buildings are of different sizes and houses and gardens are personalized. Examples of items are: two different types of homes; buildings of different heights and widths; different kinds of windows and doors.

Complexity: There are 5 items in this subscale. At first, objects are represented in an undifferentiated, syncretic way with no specific parts showing. After age 6, the essential parts begin to appear. Later, each element may be represented in a complex manner: curtains may be seen through windows, a television antenna stands on the roof, a garage is attached to the house... Examples of items are: presence of a roof, of windows, of doors.

Animation: There are 6 items in this subscale. At earlier ages, the village is totally inanimate except for the presence of smoke on chimneys. Only at around age 10, does the environment appear to be devised for humans: there are people represented strolling in the street, driving cars, and there are inscriptions on posts and buildings. Examples

of items are: presence of humans; shadows; the inscriptions on buildings.

Construction of Space-Organization: There are 21 items in this subscale. Elements of topological geometry begin to appear at around age 6 but elements of projective geometry are almost non-existent before age 10.

Topological Geometry: There are 7 items in this subcategory. Before ages 4 or 5, there is no organization of space whatsoever. If there are buildings and roads, there are no relationships between them; doors may be shown but placed anywhere on the houses. At around age 8, the different elements begin to be placed in relationship to each other: houses are arranged along a street or their driveways connect with the street. Examples of items are: groundline or lining up of buildings; houses bordering the street; driveways from houses to streets, correct connections between driveways and streets.

Euclidian Geometry: There are only 2 items in this subcategory. Around age 11, proportions begin to be respected: all doors and stories in the same plane are of approximately the same size. The two selected items have been found to have a low reliability and have been dropped from the calculations. In further studies, their replacement by more carefully defined items will be considered since what they purport to measure seems to be quite important.

Projective Geometry: There are 14 items in this subcategory which deals primarily with perspective. Rarely before age 10, does the child obtain more than a few points in this subcategory (see graph). For example, only 20% of the 9-year-

old attempts to represent perspective in their drawings of houses but all subjects of 12 years did try it. Diminution of the size of the houses with distance typically appears only around 11. Foreshortening of roads rarely appears before age 12. Examples of items are: - attempts at representing perspective in the drawing of buildings; - diminution of size with distance in the drawing of buildings.

After having presented the various subscales, I will indicate the different calculations that have been performed with the data:

- From the original scale, 9 items were eliminated because of scoring difficulties, of redundancy or absence of correlation with the total score. This revised scale of 53 items was used for all calculations.

- There was no clear-cut sex differences detected.

- Reliability between two judges on a sample of 45 drawings was found to be .96. Split-half reliability was found to be .94.

- The correlation of the total village score with the score on the Draw-A-Man test was found to be .69.

- Graphs were constructed for the total score and for each of the subscores showing the mean score per age or per grade. An examination of the graphs shown on the circulated handout clearly shows that there is a steady development in the drawing of a space-representation concept namely: a village.

- For all scores and subscores (except projective geometry), there seems to be a leveling-off around age 12. Projective geometry seems to have a delayed onset (at about age 10) as could have been expected from the work of Piaget.

Bibliography

BARNHART, E.N., 1942. Developmental stages in compositional construction in children's drawings, Journal of Experimental Education, 11, 156-184.

BAUMSTEIN-HEISSLER, N., 1955. A propos du dessin: quelques opinions et travaux de psychologues soviétiques, Enfance, 8, 377-399.

BURNS, R.C., & KAUFMAN, S.H., 1972. Actions, styles and symbols in kinetic family drawings (K-F-D): An interpretative manual, Brunner/Mazel, New York, 304 p.

COSTE, J. C., 1975. Corps et graphie: l'expression psychomotrice de l'enfant dans le dessin et la peinture. EPI, Paris, 156 p.

DI LEO, J.H., 1970. Young children and their drawings, Brunner/Mazel, New York, 386 p.

DI LEO, J.H., 1973. Children's drawings as diagnostic aids, Brunner/Mazel, New York, 227 p.

ENG, H., 1957. The psychology of child and youth drawing. Routledge and Kegan, London, 205 p.

ENG, H., 1966. The psychology of children's drawings: from the first stroke to the coloured drawing. Routledge and Kegan, London, 223 p.

FAY, H.M., 1934. L'intelligence et le caractère. Leurs anomalies chez l'enfant. Foyer central d'Hygiène, Paris, 356 p.

GOODENOUGH, F.L., 1928. Studies in the psychology of children's drawings. Psychological Bulletin, 25, 272-283.

GOODENOUGH, F.L. & HARRIS, D.B., 1950. Studies in the psychology of children's drawings: II - 1928-1949. Psychological Bulletin, 47, 369-433.

HARRIS, D.B., 1963. Children's drawings as measures of intellectual maturity: a revision and extension of the Goodenough Draw-A-Man test. Harcourt, Brace and World, New York, 367 p.

HEMMENDINGER, L., 1953. Perceptual organization and development as reflected in the structure of Rorschach test responses. Journal of Projected Technology, 17, 162-170.

HEMMENDINGER, L., 1965. Developmental theory and the Rorschach Method, p. 58-79. In RICKERS-OVSIANKINA, M.A. Rorschach Psychology, John Wiley & Sons, Inc., New York, 483 p.

HENDRICKSON, N.J. & WARCHOL, B., 1974. Young children's social maturity and their drawings. Child Study Journal, 4, 115-123.

HILDRETH, G., 1941. The child mind in evolution: a study of developmental sequences in drawing. King's Crown Press, New York, 163 p.

JACOBSON, D.A., 1973. A study of kinetic family drawings of public school children, ages six through nine. Dissertation Abstracts International, 34(6-B), 2935.

KELLOG, R., 1970. Analyzing children's art. Mayfield, Palo Alto, California, 308 p.

KERR, M., 1937. Children's drawings of houses, British Journal of Medical Psychology, 16, 206-218.

KOCH, C., 1964. Le test de l'arbre: le diagnostic psychologique par le dessin de l'arbre. Emmanuel Vitte, Lyoin, 442 p.

OLIVIER, F., 1974. Le dessin enfantin est-il une écriture? Enfance, 3-5, 183-216.

PIAGET, J. & INHELDER, B., 1948. La représentation de l'espace chez l'enfant. Presses Universitaires de France, Paris VI, 581 p.

PIAGET, J., 19 . La représentation du monde chez l'enfant, PUF.

RUSSELL, C.L., 1974. An experimental study of conceptual behavior as a function of concept organization, visual stimulus availability and art application. Dissertation Abstracts International, 35, (3-A), 1513.

SHARMA, T.R., 1972. Measuring intelligence through bicycle drawings. Indian Educational Review, 7, 1-30.

UHLIN, D.M., 1972. Art for exceptional children, W.C. Brown Co. Pub., Dubuque, Iowa, 146 p.

UPTON, V.M., 1974. Concept expression in children's drawings and its relationship to developmental variables. Dissertation Abstracts International, 34 (7-B), 3511-3512.

WERNER, H., 1948. Comparative psychology of mental development, Follet, Chicago.

PROGRESSES ACCOMPLISHED WITH AGE IN SPACE ORGANIZATION

CAROLE (figure 1)
One house is representative of the whole village

STEPHANE (figure 2)
Many elements constitutive of a village (houses, stores, church, road, driveways) are present (high differentiation) but they are in no way organized.

JACINTHE (figure 3)
There is some organization of space : elements are placed in a row

SUSAN (figure 4)
Space organization is characteristic : there are two rows, one for cars, one for houses and persons

YVES (figure 5)
Again several rows but this time they clearly represent different planes : the buildings in the upper row are smaller than the buildings in the lower row.
There is also an attempt at unifying the two separate rows.

ROXANNE (figure 6)
The organization of space is more complex but there is still no diminution of size with distance

CHARLES (figure 7)
This is a good example of passage from a drawing organized in rows to a representation of a more continuous space, characteristic of more mature drawings.

MARC (figure 8)
This is the first drawing in which roads and houses are clearly integrated into one drawing.

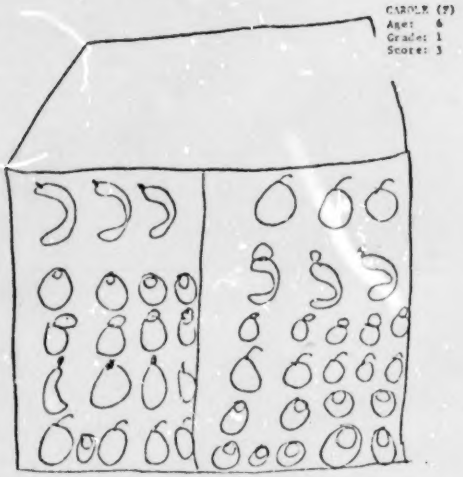
MICHELLE (figure 9)
Overlapping is used in a sophisticated way demonstrating the adoption by the child of a specific point of view.

YVES (figure 10)
Contrary to the preceding two drawings, integration is poor. There are however quite successful attempts at representing perspective in the drawing of buildings and a clear representation of distance.

MICHELLE (figure 11)
The child has tried to apply the laws of perspective but because she was unable to adopt one specific point of view, the laws of perspective are applied arbitrarily (reversed linear perspective in the drawing of the driveway leading to the church).

RENEE (figure 12)
The best drawing of the 158
Representation of space is very good with appropriate use of overlapping of objects, systematic foreshortening of roads and of buildings, some representation of perspective and a very homogeneous space.

Figure 1



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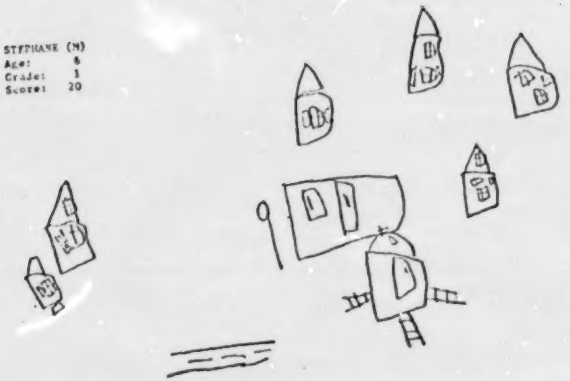
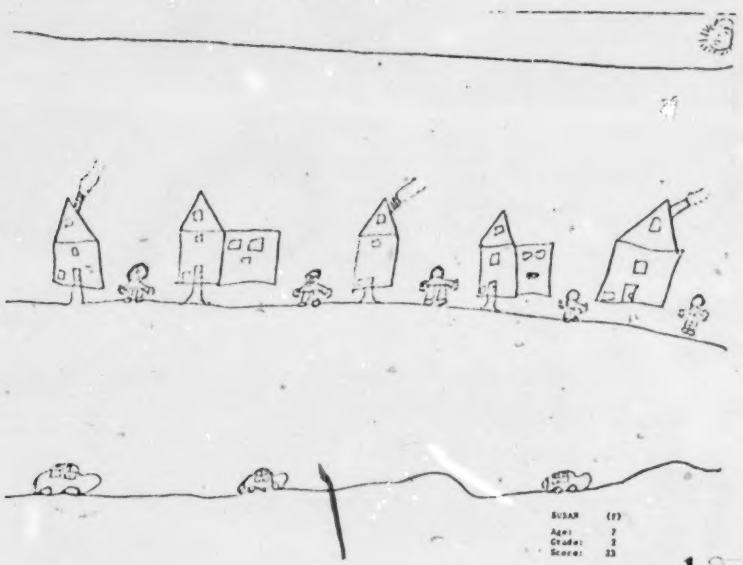


Figure 3

Figure 4



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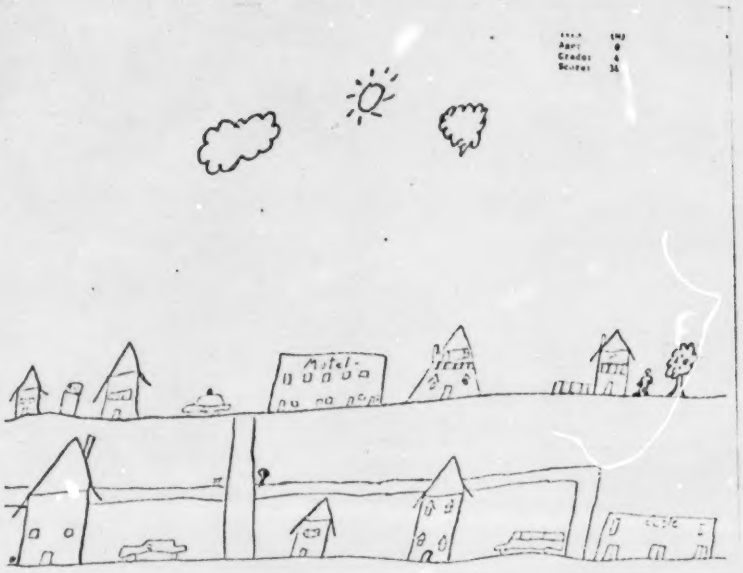

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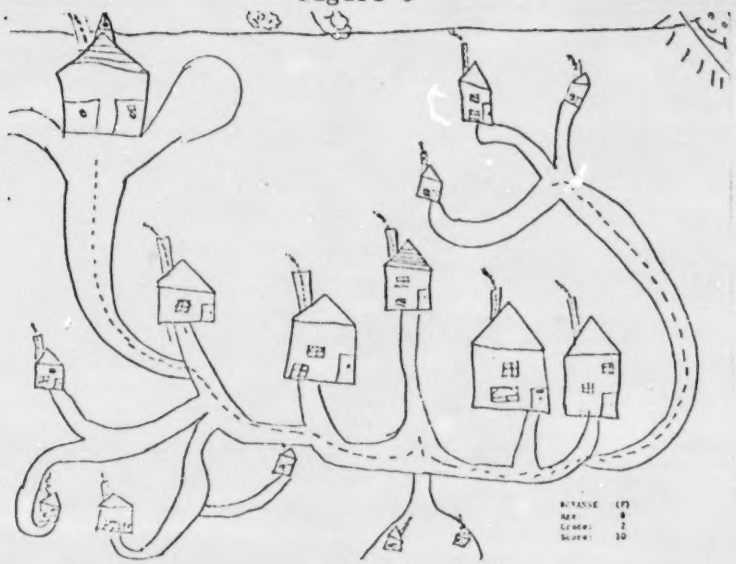


Figure 7

Figure 8

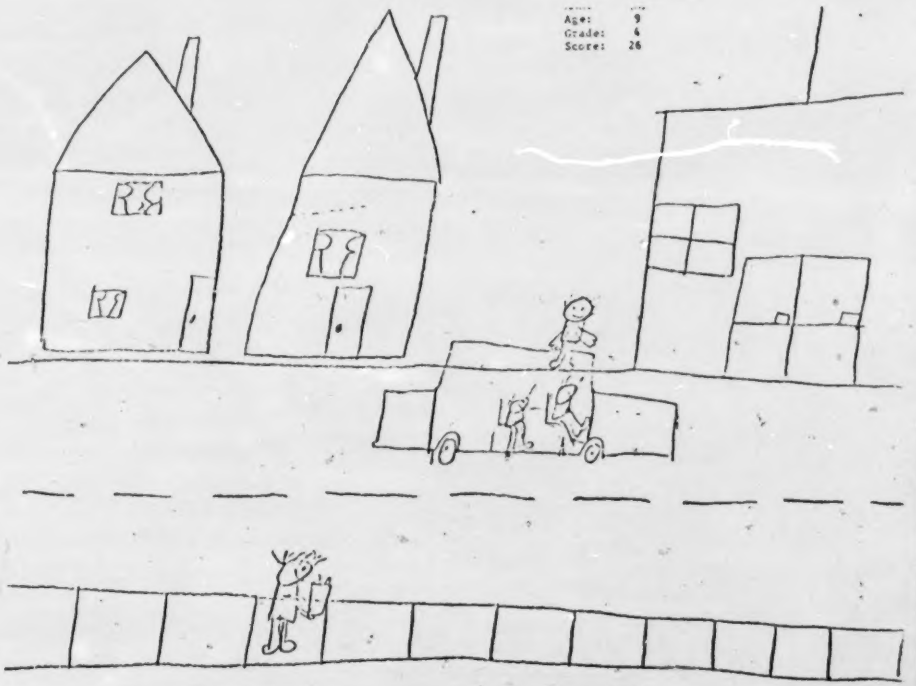
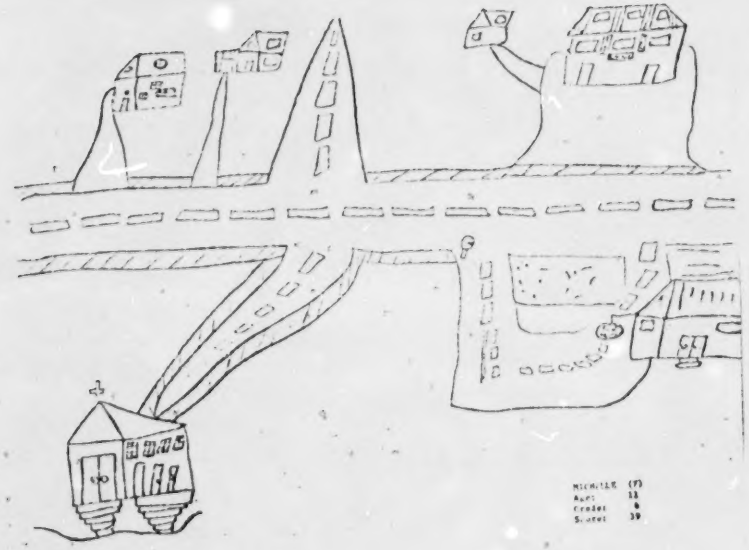


Figure 9

Figure 10

Figure 11



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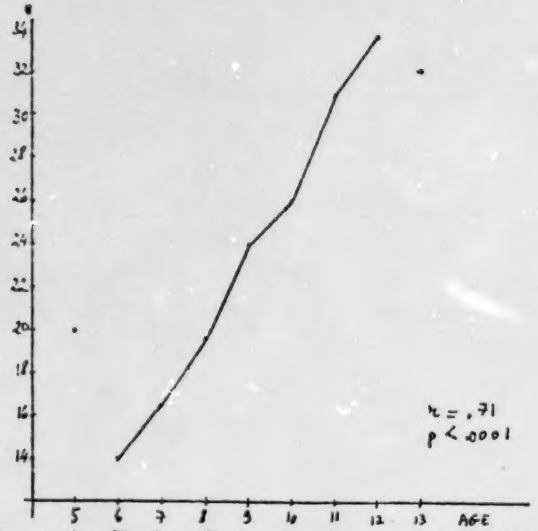

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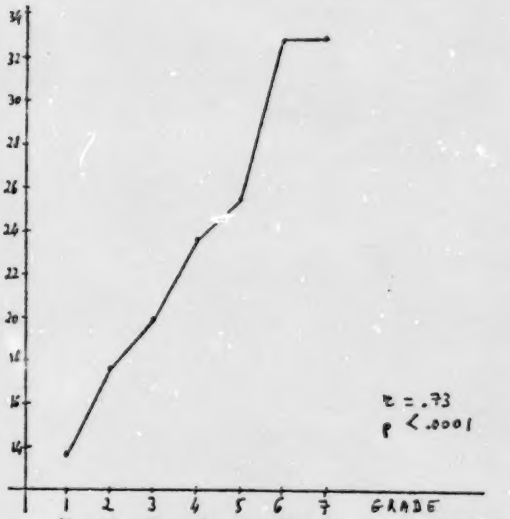

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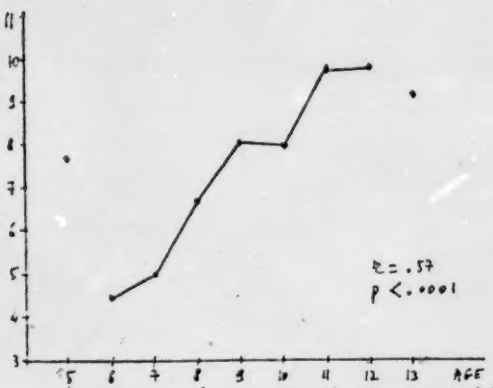

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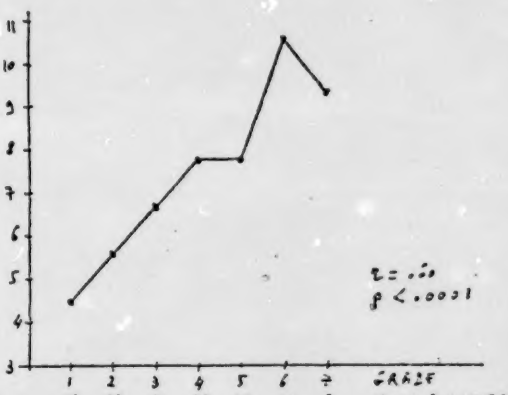

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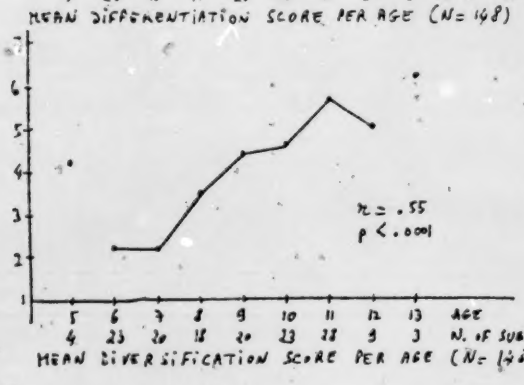

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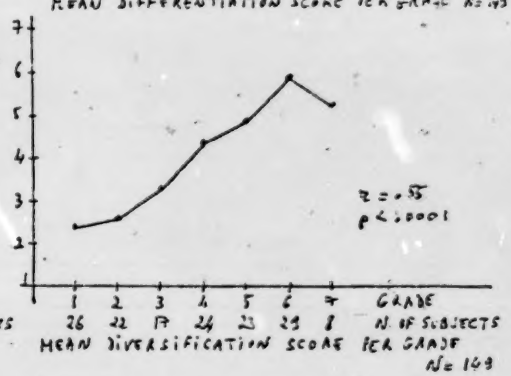

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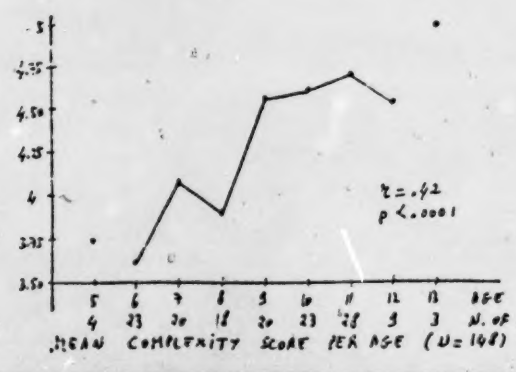

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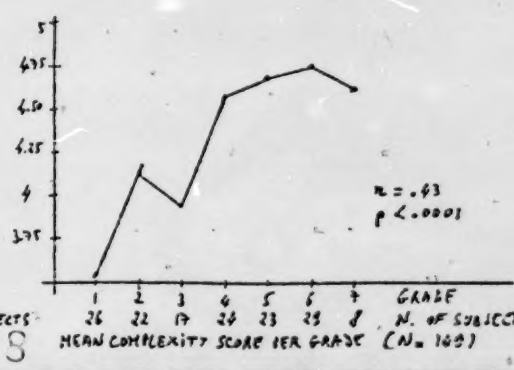

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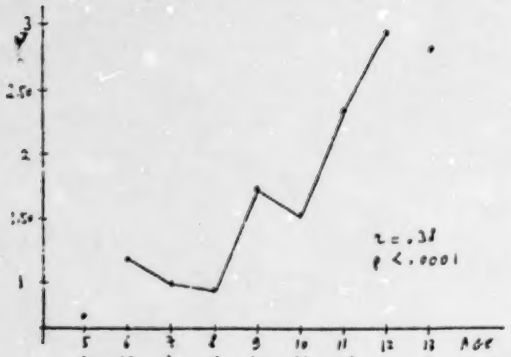

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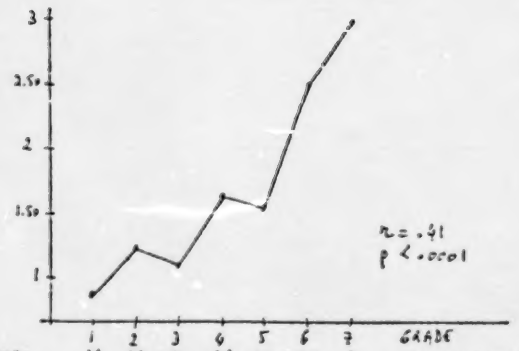

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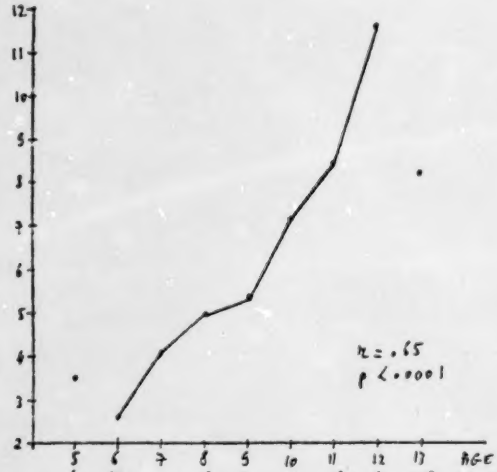

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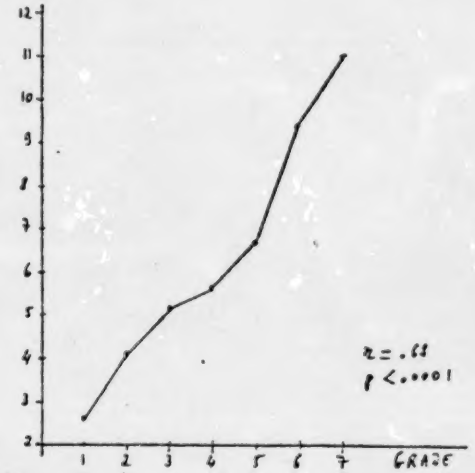

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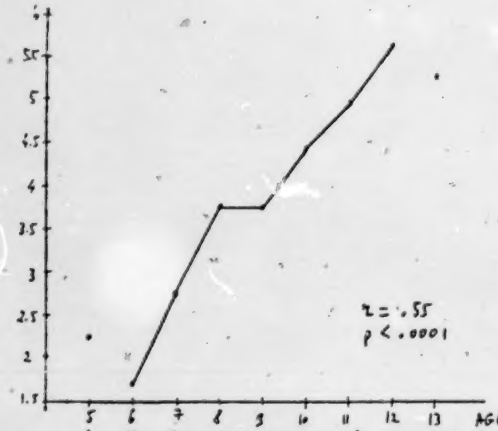

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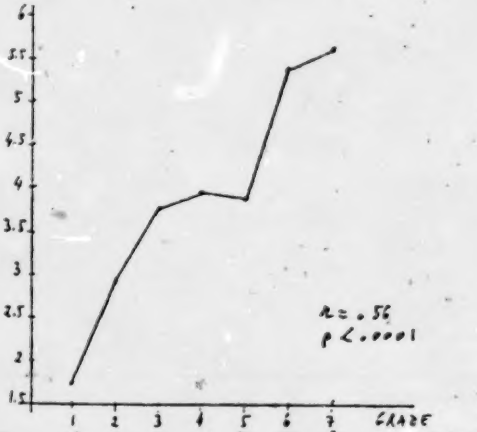

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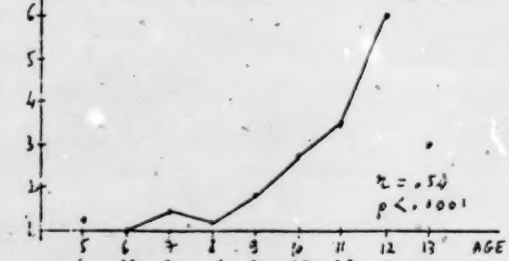

AGE	5	6	7	8	9	10	11	12	13
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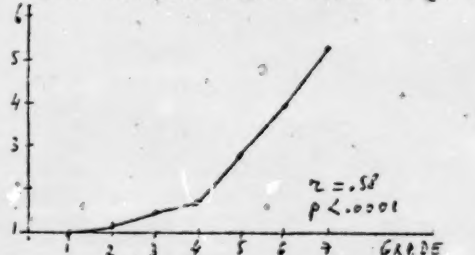

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